1. What are the *possible Integer* roots of the polynomial below?

$$f(x) = 6x^3 + 6x^2 + 3x + 3$$

   A. All combinations of: $\dfrac{\pm 1, \pm 2, \pm 3, \pm 6}{\pm 1, \pm 3}$

   B. All combinations of: $\dfrac{\pm 1, \pm 3}{\pm 1, \pm 2, \pm 3, \pm 6}$

   C. $\pm 1, \pm 3$

   D. $\pm 1, \pm 2, \pm 3, \pm 6$

   E. There is no formula or theorem that tells us all possible Integer roots.

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2. Factor the polynomial below completely. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 10x^3 + 69x^2 + 126x + 40$$

   A. $z_1 \in [0.5, 0.51]$, $z_2 \in [1.71, 2.09]$, and $z_3 \in [3, 8]$

   B. $z_1 \in [-4.04, -3.94]$, $z_2 \in [-2.53, -2.26]$, and $z_3 \in [-0.4, 1.6]$

   C. $z_1 \in [-4.04, -3.94]$, $z_2 \in [-2.53, -2.26]$, and $z_3 \in [-0.4, 1.6]$

   D. $z_1 \in [0.26, 0.44]$, $z_2 \in [2.47, 2.97]$, and $z_3 \in [3, 8]$

   E. $z_1 \in [0.26, 0.44]$, $z_2 \in [2.47, 2.97]$, and $z_3 \in [3, 8]$

---

3. Factor the polynomial below completely, knowing that $x - 5$ is a factor. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3 \leq z_4$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 9x^4 - 72x^3 + 143x^2 - 20x - 100$$

   A. $z_1 \in [-1.83, -1.34]$, $z_2 \in [0, 1.3]$, $z_3 \in [1.98, 2.07]$, and $z_4 \in [4.67, 5.09]$

   B. $z_1 \in [-5.3, -4.93]$, $z_2 \in [-2.3, -1.3]$, $z_3 \in [-0.62, -0.59]$, and $z_4 \in [1.38, 1.7]$

C. $z_1 \in [-0.84, -0.37]$, $z_2 \in [0.9, 3.3]$, $z_3 \in [1.98, 2.07]$, and $z_4 \in [4.67, 5.09]$

D. $z_1 \in [-5.3, -4.93]$, $z_2 \in [-2.3, -1.3]$, $z_3 \in [-0.56, -0.53]$, and $z_4 \in [1.66, 2.22]$

E. $z_1 \in [-5.3, -4.93]$, $z_2 \in [-2.3, -1.3]$, $z_3 \in [-1.73, -1.65]$, and $z_4 \in [0.46, 1.24]$

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4. Factor the polynomial below completely, knowing that $x - 2$ is a factor. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3 \leq z_4$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 20x^4 - 127x^3 + 94x^2 + 235x - 150$$

A. $z_1 \in [-5, -4.55]$, $z_2 \in [-2.9, -0.1]$, $z_3 \in [-0.71, -0.18]$, and $z_4 \in [1, 1.45]$

B. $z_1 \in [-1.28, -1.03]$, $z_2 \in [0, 1.5]$, $z_3 \in [1.97, 2.15]$, and $z_4 \in [4.9, 5.35]$

C. $z_1 \in [-5, -4.55]$, $z_2 \in [-3.9, -2.1]$, $z_3 \in [-2.2, -1.98]$, and $z_4 \in [-0.37, 0.46]$

D. $z_1 \in [-5, -4.55]$, $z_2 \in [-2.9, -0.1]$, $z_3 \in [-1.86, -1.52]$, and $z_4 \in [0.53, 0.99]$

E. $z_1 \in [-1.21, -0.52]$, $z_2 \in [1.5, 1.8]$, $z_3 \in [1.97, 2.15]$, and $z_4 \in [4.9, 5.35]$

---

5. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{8x^3 - 10x^2 - 32x + 43}{x + 2}$$

A. $a \in [7, 9]$, $b \in [-36, -33]$, $c \in [67, 76]$, and $r \in [-172, -165]$.

B. $a \in [-19, -14]$, $b \in [22, 23]$, $c \in [-78, -74]$, and $r \in [195, 200]$.

C. $a \in [-19, -14]$, $b \in [-45, -41]$, $c \in [-120, -112]$, and $r \in [-189, -187]$.

D. $a \in [7, 9]$, $b \in [-26, -23]$, $c \in [19, 25]$, and $r \in [2, 11]$.

E. $a \in [7, 9]$, $b \in [4, 13]$, $c \in [-23, -14]$, and $r \in [2, 11]$.

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6. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{15x^3 + 63x^2 - 43}{x + 4}$$

A. $a \in [14, 18], b \in [-3, 5], c \in [-14, -8]$, and $r \in [5, 9]$.

B. $a \in [14, 18], b \in [120, 126], c \in [492, 495]$, and $r \in [1925, 1931]$.

C. $a \in [14, 18], b \in [-13, -8], c \in [60, 61]$, and $r \in [-348, -342]$.

D. $a \in [-64, -57], b \in [-184, -173], c \in [-709, -707]$, and $r \in [-2875, -2869]$.

E. $a \in [-64, -57], b \in [303, 307], c \in [-1213, -1210]$, and $r \in [4803, 4809]$.

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7. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{4x^3 + 12x^2 - 11}{x + 2}$$

A. $a \in [-8, -6], b \in [22, 32], c \in [-60, -55]$, and $r \in [101, 107]$.

B. $a \in [-2, 7], b \in [0, 2], c \in [0, 2]$, and $r \in [-13, -10]$.

C. $a \in [-2, 7], b \in [17, 25], c \in [40, 41]$, and $r \in [64, 71]$.

D. $a \in [-2, 7], b \in [2, 5], c \in [-11, -5]$, and $r \in [5, 9]$.

E. $a \in [-8, -6], b \in [-6, -3], c \in [-11, -5]$, and $r \in [-30, -25]$.

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8. What are the *possible Rational* roots of the polynomial below?

$$f(x) = 7x^2 + 7x + 5$$

A. $\pm 1, \pm 7$

B. All combinations of: $\dfrac{\pm 1, \pm 5}{\pm 1, \pm 7}$

C. All combinations of: $\dfrac{\pm 1, \pm 7}{\pm 1, \pm 5}$

D. $\pm 1, \pm 5$

E. There is no formula or theorem that tells us all possible Rational roots.

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9. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{8x^3 + 6x^2 - 32x - 19}{x - 2}$$

A. $a \in [8, 10],\ b \in [18, 29],\ c \in [12, 16],$ and $r \in [4, 8]$.

B. $a \in [16, 19],\ b \in [-31, -20],\ c \in [16, 25],$ and $r \in [-59, -54]$.

C. $a \in [8, 10],\ b \in [13, 17],\ c \in [-22, -15],$ and $r \in [-39, -36]$.

D. $a \in [16, 19],\ b \in [30, 43],\ c \in [37, 48],$ and $r \in [65, 72]$.

E. $a \in [8, 10],\ b \in [-14, -8],\ c \in [-15, -7],$ and $r \in [4, 8]$.

---

10. Factor the polynomial below completely. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 15x^3 - 23x^2 - 58x - 24$$

A. $z_1 \in [-3.4, -2.1],\ z_2 \in [-0.39, 0.17],$ and $z_3 \in [3.38, 4.26]$

B. $z_1 \in [-1.7, -1.3],\ z_2 \in [-1.49, -1.12],$ and $z_3 \in [2.93, 3.49]$

C. $z_1 \in [-1, 0.4],\ z_2 \in [-1.03, -0.38],$ and $z_3 \in [2.93, 3.49]$

D. $z_1 \in [-3.4, -2.1],\ z_2 \in [0.52, 0.91],$ and $z_3 \in [0.31, 1.05]$

E. $z_1 \in [-3.4, -2.1],\ z_2 \in [1.13, 1.64],$ and $z_3 \in [1.47, 1.82]$

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11. What are the *possible Rational* roots of the polynomial below?

$$f(x) = 5x^2 + 5x + 4$$

A. All combinations of: $\dfrac{\pm 1, \pm 5}{\pm 1, \pm 2, \pm 4}$

B. $\pm 1, \pm 5$

C. $\pm 1, \pm 2, \pm 4$

D. All combinations of: $\dfrac{\pm 1, \pm 2, \pm 4}{\pm 1, \pm 5}$

E. There is no formula or theorem that tells us all possible Rational roots.

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12. Factor the polynomial below completely. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 9x^3 + 39x^2 - 8x - 80$$

A. $z_1 \in [-1.1, -0.4]$, $z_2 \in [0.56, 0.75]$, and $z_3 \in [3.49, 4.11]$

B. $z_1 \in [-2.6, -1.1]$, $z_2 \in [1.59, 1.67]$, and $z_3 \in [3.49, 4.11]$

C. $z_1 \in [-4.7, -3.7]$, $z_2 \in [-1.72, -1.42]$, and $z_3 \in [1.09, 1.96]$

D. $z_1 \in [-4.7, -3.7]$, $z_2 \in [0.26, 0.56]$, and $z_3 \in [3.49, 4.11]$

E. $z_1 \in [-4.7, -3.7]$, $z_2 \in [-0.77, -0.4]$, and $z_3 \in [0.37, 1.18]$

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13. Factor the polynomial below completely, knowing that $x - 5$ is a factor. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3 \leq z_4$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 15x^4 - 92x^3 + 39x^2 + 270x - 200$$

A. $z_1 \in [-2.3, -1.61]$, $z_2 \in [0.62, 0.99]$, $z_3 \in [1.93, 2.23]$, and $z_4 \in [4.89, 5.01]$

B. $z_1 \in [-5.63, -4.89]$, $z_2 \in [-2.34, -1.66]$, $z_3 \in [-0.87, -0.67]$, and $z_4 \in [1.66, 1.72]$

C. $z_1 \in [-5.63, -4.89]$, $z_2 \in [-2.34, -1.66]$, $z_3 \in [-1.62, -1.11]$, and $z_4 \in [0.45, 0.77]$

D. $z_1 \in [-1.59, 0.58]$, $z_2 \in [1.2, 1.55]$, $z_3 \in [1.93, 2.23]$, and $z_4 \in [4.89, 5.01]$

E. $z_1 \in [-5.63, -4.89]$, $z_2 \in [-4.07, -3.93]$, $z_3 \in [-2.51, -1.78]$, and $z_4 \in [0.05, 0.48]$

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14. Factor the polynomial below completely, knowing that $x+2$ is a factor. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3 \leq z_4$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 25x^4 - 30x^3 - 92x^2 + 120x - 32$$

A. $z_1 \in [-2.17, -1.33]$, $z_2 \in [0.53, 1.48]$, $z_3 \in [1.78, 2.63]$, and $z_4 \in [2.42, 2.65]$

B. $z_1 \in [-4.85, -3.25]$, $z_2 \in [-2.97, -1.92]$, $z_3 \in [-0.16, 0.52]$, and $z_4 \in [1.76, 2.05]$

C. $z_1 \in [-3.07, -2.47]$, $z_2 \in [-2.97, -1.92]$, $z_3 \in [-1.63, -1.11]$, and $z_4 \in [1.76, 2.05]$

D. $z_1 \in [-2.17, -1.33]$, $z_2 \in [0.34, 0.92]$, $z_3 \in [0.39, 0.81]$, and $z_4 \in [1.76, 2.05]$

E. $z_1 \in [-2.17, -1.33]$, $z_2 \in [-1.63, -0.5]$, $z_3 \in [-0.48, -0.13]$, and $z_4 \in [1.76, 2.05]$

---

15. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{16x^3 - 52x^2 + 46x - 15}{x - 2}$$

A. $a \in [32, 37]$, $b \in [8, 16]$, $c \in [69, 71]$, and $r \in [122.2, 127.7]$.

B. $a \in [14, 24]$, $b \in [-23, -12]$, $c \in [6, 7]$, and $r \in [-4.3, -0.7]$.

C. $a \in [14, 24]$, $b \in [-37, -31]$, $c \in [8, 14]$, and $r \in [-6, -4.3]$.

D. $a \in [14, 24]$, $b \in [-88, -80]$, $c \in [210, 216]$, and $r \in [-444, -440.8]$.

E. $a \in [32, 37]$, $b \in [-117, -112]$, $c \in [275, 283]$, and $r \in [-571.4, -568.5]$.

16. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{10x^3 + 42x^2 - 34}{x + 4}$$

A. $a \in [9, 11], b \in [-9, -7], c \in [39, 41],$ and $r \in [-237, -229]$.

B. $a \in [9, 11], b \in [2, 6], c \in [-9, -7],$ and $r \in [-7, 2]$.

C. $a \in [-42, -35], b \in [-123, -117], c \in [-484, -465],$ and $r \in [-1925, -1919]$.

D. $a \in [9, 11], b \in [81, 85], c \in [327, 330],$ and $r \in [1277, 1283]$.

E. $a \in [-42, -35], b \in [198, 207], c \in [-810, -806],$ and $r \in [3198, 3204]$.

17. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{12x^3 - 28x^2 + 18}{x - 2}$$

A. $a \in [10, 14], b \in [-7, -3], c \in [-9, -5],$ and $r \in [-2, 9]$.

B. $a \in [10, 14], b \in [-52, -47], c \in [99, 105],$ and $r \in [-191, -188]$.

C. $a \in [10, 14], b \in [-16, -12], c \in [-16, -10],$ and $r \in [-2, 9]$.

D. $a \in [24, 28], b \in [18, 24], c \in [32, 42],$ and $r \in [94, 102]$.

E. $a \in [24, 28], b \in [-78, -75], c \in [145, 153],$ and $r \in [-289, -284]$.

18. What are the *possible Rational* roots of the polynomial below?

$$f(x) = 3x^3 + 4x^2 + 2x + 4$$

A. $\pm 1, \pm 3$

B. $\pm 1, \pm 2, \pm 4$

C. All combinations of: $\dfrac{\pm 1, \pm 2, \pm 4}{\pm 1, \pm 3}$

D. All combinations of: $\dfrac{\pm 1, \pm 3}{\pm 1, \pm 2, \pm 4}$

E. There is no formula or theorem that tells us all possible Rational roots.

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19. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{15x^3 + 25x^2 - 20x - 18}{x + 2}$$

A. $a \in [10, 18], \; b \in [-25, -12], \; c \in [40, 42], \text{ and } r \in [-140, -137].$

B. $a \in [10, 18], \; b \in [-7, 0], \; c \in [-11, -8], \text{ and } r \in [2, 4].$

C. $a \in [10, 18], \; b \in [52, 58], \; c \in [85, 91], \text{ and } r \in [160, 168].$

D. $a \in [-35, -26], \; b \in [-39, -30], \; c \in [-93, -85], \text{ and } r \in [-198, -197].$

E. $a \in [-35, -26], \; b \in [83, 90], \; c \in [-190, -185], \text{ and } r \in [360, 364].$

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20. Factor the polynomial below completely. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 20x^3 - 123x^2 + 121x - 30$$

A. $z_1 \in [0.7, 2.1], \; z_2 \in [2.4, 2.6], \text{ and } z_3 \in [4.71, 5.05]$

B. $z_1 \in [-5.8, -3.8], \; z_2 \in [-2.7, -1.6], \text{ and } z_3 \in [-1.34, -1.16]$

C. $z_1 \in [-5.8, -3.8], \; z_2 \in [-1.5, -0.6], \text{ and } z_3 \in [-0.48, -0.32]$

D. $z_1 \in [-0.4, 0.7], \; z_2 \in [0.5, 2], \text{ and } z_3 \in [4.71, 5.05]$

E. $z_1 \in [-5.8, -3.8], \; z_2 \in [-3.3, -2.8], \text{ and } z_3 \in [-0.11, -0.07]$

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21. What are the *possible Integer* roots of the polynomial below?

$$f(x) = 7x^2 + 7x + 2$$

A. All combinations of: $\dfrac{\pm 1, \pm 2}{\pm 1, \pm 7}$

B. $\pm 1, \pm 7$

C. $\pm 1, \pm 2$

D. All combinations of: $\dfrac{\pm 1, \pm 7}{\pm 1, \pm 2}$

E. There is no formula or theorem that tells us all possible Integer roots.

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22. Factor the polynomial below completely. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 9x^3 - 39x^2 + 52x - 20$$

A. $z_1 \in [-5.01, -4.98]$, $z_2 \in [-2.06, -1.97]$, and $z_3 \in [-0.27, -0.21]$

B. $z_1 \in [0.67, 0.72]$, $z_2 \in [1.62, 1.68]$, and $z_3 \in [1.96, 2.08]$

C. $z_1 \in [0.45, 0.64]$, $z_2 \in [1.45, 1.53]$, and $z_3 \in [1.96, 2.08]$

D. $z_1 \in [-2, -1.9]$, $z_2 \in [-1.83, -1.63]$, and $z_3 \in [-0.68, -0.64]$

E. $z_1 \in [-2, -1.9]$, $z_2 \in [-1.6, -1.45]$, and $z_3 \in [-0.62, -0.56]$

---

23. Factor the polynomial below completely, knowing that $x - 5$ is a factor. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3 \leq z_4$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 15x^4 - 41x^3 - 266x^2 + 512x - 160$$

A. $z_1 \in [-5.3, -4.1]$, $z_2 \in [-2.37, -1.54]$, $z_3 \in [-0.37, -0.19]$, and $z_4 \in [2.7, 4.3]$

B. $z_1 \in [-4.6, -0.9]$, $z_2 \in [0.42, 0.84]$, $z_3 \in [2.4, 2.57]$, and $z_4 \in [4.4, 5.1]$

C. $z_1 \in [-5.3, -4.1]$, $z_2 \in [-1.77, -1.09]$, $z_3 \in [-0.65, -0.35]$, and $z_4 \in [2.7, 4.3]$

D. $z_1 \in [-5.3, -4.1]$, $z_2 \in [-2.52, -2.43]$, $z_3 \in [-0.84, -0.7]$, and $z_4 \in [2.7, 4.3]$

E. $z_1 \in [-4.6, -0.9]$, $z_2 \in [0.35, 0.54]$, $z_3 \in [1.29, 1.39]$, and $z_4 \in [4.4, 5.1]$

---

24. Factor the polynomial below completely, knowing that $x+5$ is a factor. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3 \leq z_4$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 10x^4 + 53x^3 - 39x^2 - 310x - 200$$

A. $z_1 \in [-2.56, -2.48]$, $z_2 \in [0.49, 1.07]$, $z_3 \in [1.47, 2.9]$, and $z_4 \in [3.3, 5.3]$

B. $z_1 \in [-5.02, -4.99]$, $z_2 \in [-2.01, -1.47]$, $z_3 \in [-1.12, -0.05]$, and $z_4 \in [0.6, 3.6]$

C. $z_1 \in [-5.02, -4.99]$, $z_2 \in [-2.01, -1.47]$, $z_3 \in [-1.29, -1.2]$, and $z_4 \in [-0.5, 1.1]$

D. $z_1 \in [-0.48, -0.31]$, $z_2 \in [1.22, 1.73]$, $z_3 \in [1.47, 2.9]$, and $z_4 \in [3.3, 5.3]$

E. $z_1 \in [-0.52, -0.47]$, $z_2 \in [1.99, 2.21]$, $z_3 \in [3.32, 5.3]$, and $z_4 \in [3.3, 5.3]$

---

25. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{20x^3 + 118x^2 + 94x + 16}{x + 5}$$

A. $a \in [16, 25]$, $b \in [-5, 2]$, $c \in [100, 110]$, and $r \in [-621, -614]$.

B. $a \in [-102, -98]$, $b \in [-387, -379]$, $c \in [-1818, -1815]$, and $r \in [-9072, -9061]$.

C. $a \in [-102, -98]$, $b \in [618, 620]$, $c \in [-2998, -2994]$, and $r \in [14988, 14999]$.

D. $a \in [16, 25]$, $b \in [16, 22]$, $c \in [2, 8]$, and $r \in [-4, 0]$.

E. $a \in [16, 25]$, $b \in [216, 224]$, $c \in [1182, 1188]$, and $r \in [5935, 5938]$.

26. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{15x^3 + 35x^2 - 15}{x + 2}$$

A. $a \in [-37, -28], b \in [-34, -21], c \in [-58, -46],$ and $r \in [-121, -110]$.

B. $a \in [13, 17], b \in [63, 67], c \in [129, 131],$ and $r \in [242, 246]$.

C. $a \in [13, 17], b \in [3, 8], c \in [-11, -9],$ and $r \in [4, 6]$.

D. $a \in [-37, -28], b \in [93, 96], c \in [-191, -184],$ and $r \in [364, 367]$.

E. $a \in [13, 17], b \in [-15, -5], c \in [27, 36],$ and $r \in [-105, -98]$.

27. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{6x^3 - 18x - 14}{x - 2}$$

A. $a \in [6, 9], b \in [-14, -11], c \in [4, 11],$ and $r \in [-30, -19]$.

B. $a \in [6, 9], b \in [1, 10], c \in [-12, -11],$ and $r \in [-30, -19]$.

C. $a \in [11, 13], b \in [24, 26], c \in [29, 33],$ and $r \in [40, 49]$.

D. $a \in [11, 13], b \in [-24, -23], c \in [29, 33],$ and $r \in [-81, -72]$.

E. $a \in [6, 9], b \in [9, 14], c \in [4, 11],$ and $r \in [-4, -1]$.

28. What are the *possible Rational* roots of the polynomial below?

$$f(x) = 4x^3 + 2x^2 + 7x + 7$$

A. All combinations of: $\dfrac{\pm 1, \pm 7}{\pm 1, \pm 2, \pm 4}$

B. All combinations of: $\dfrac{\pm 1, \pm 2, \pm 4}{\pm 1, \pm 7}$

C. $\pm 1, \pm 2, \pm 4$

D. $\pm 1, \pm 7$

E. There is no formula or theorem that tells us all possible Rational roots.

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29. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{20x^3 - 67x^2 - 155x - 53}{x - 5}$$

A. $a \in [20, 22],\ b \in [29, 39],\ c \in [4, 14],$ and $r \in [-5, -2]$.

B. $a \in [20, 22],\ b \in [-170, -166],\ c \in [677, 685],$ and $r \in [-3457, -3448]$.

C. $a \in [99, 105],\ b \in [-569, -562],\ c \in [2678, 2688],$ and $r \in [-13455, -13451]$.

D. $a \in [20, 22],\ b \in [11, 15],\ c \in [-107, -100],$ and $r \in [-468, -461]$.

E. $a \in [99, 105],\ b \in [428, 436],\ c \in [2005, 2011],$ and $r \in [9992, 9998]$.

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30. Factor the polynomial below completely. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 12x^3 - 13x^2 - 59x - 30$$

A. $z_1 \in [-1.53, -1.3],\ z_2 \in [-0.81, -0.72],$ and $z_3 \in [2.54, 3.21]$

B. $z_1 \in [-3.01, -2.71],\ z_2 \in [0.63, 0.72],$ and $z_3 \in [1.21, 1.29]$

C. $z_1 \in [-3.01, -2.71],\ z_2 \in [0.24, 0.55],$ and $z_3 \in [1.99, 2.09]$

D. $z_1 \in [-1.34, -1.02],\ z_2 \in [-0.67, -0.6],$ and $z_3 \in [2.54, 3.21]$

E. $z_1 \in [-3.01, -2.71],\ z_2 \in [0.72, 0.85],$ and $z_3 \in [1.38, 1.64]$
